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REVIEW

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Public and dental teams' views about weight management interventions in dental health settings: Systematic review and meta-analysis

Jessica F. Large | Claire Madigan | Henrietta Graham | Gregory J. H. Biddle | James Sanders | Amanda J. Daley

Centre for Lifestyle Medicine and Behaviour, School of Sport, Exercise and Health Sciences, National Centre for Sport and Exercise Medicine, Loughborough University, Loughborough, UK

Correspondence
Jessica F Large, Centre for Sport and Exercise Medicine, School of Sport, Exercise and Health Sciences, Epinal Way, Loughborough University, Loughborough, LE11 3TU, UK.
Email: j.large@lboro.ac.uk

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Summary

Collaborative approaches across healthcare to address obesity are needed but intervention in dental settings is not widely implemented. Here we systematically synthesized the views of both the public and dental teams about delivering weight management interventions in dental settings and identified potential barriers to implementation. A systematic review of five databases from inception to April 3, 2023 was completed. Proportional meta-analyses were performed with quantitative data and thematic analysis of qualitative data. A total of 7851 studies were screened and 33 included in the review. The prevalence of height and weight screening in dental settings varied (4%–87%) with an average of 29% undertaking screening ($p = <0.01$; 95% CI: 14%–46%). A significant proportion of the public were supportive of weight screening in dental settings (83%; $p = <0.01$; 95% CI:76%–88%). Significant barriers to providing weight screening and/or intervention included fear of offending patients (57%; 95% CI: 45%–68%) and a lack of time (48%; 95% CI: 30%–66%). Qualitative data revealed further barriers including stigmatizing views of dental teams toward people living with overweight/obesity. Enablers of weight discussion included associating weight with oral health. Overall, whilst some barriers were identified, there is potential for weight management interventions to be used more routinely in dental settings.

KEYWORDS
dental, meta-analysis, obesity, systematic review

1 | INTRODUCTION

Obesity is a global public health crisis with 39 million children under 5 years of age and >1.9 billion adults worldwide living with overweight or obesity.[1,2] Children living with overweight or obesity are also significantly more likely to experience dental decay.[3] Regarding adults, a consensus is still yet to be reached but many studies have reported poorer oral health outcomes in relation to obesity.[4–7] National guidance recommends collaboration across healthcare services, including dental teams, to take opportunistic moments during routine appointments, to support people living with overweight or obesity to make healthy lifestyle changes.[8–14] Dental teams may be

well placed to provide support to the public, given their extensive and regular contact with millions of people every year.[15] Dental teams already engage in successful brief behavior change interventions, for example smoking cessation, and provide dietary advice in line with recommended practice, particularly regarding reduction of sugar sweetened beverages (SSBs) and sugary snacks. This can act as a platform on which to address and have discussions about weight.[16,17]

Two previous systematic reviews have examined the involvement of dental teams in addressing obesity.[18,19] The first summarized evidence regarding dental school curricula in preparing dental students to reduce childhood obesity and consumption of SSBs.[18] The review found that the preparedness and knowledge of dental students and dental hygiene and therapy students on childhood obesity and SSBs was low with recommendations for greater inclusion of teaching about obesity and its management within dental school curricula and guidance in commissioning standards.[18] The second review explored dental teams' documented practices and their perceived barriers concluding that the majority support their role in assisting patients in healthy weight management.[19] The review also highlighted an interest from dental teams in developing knowledge and skills for weight intervention identifying lack of training and fear of offending patients as key barriers. Whilst offering an important insight into the profession's practices and views, this review did not consider views and experiences of the public and was limited to 10 studies all within high-income countries and descriptive analysis.[19] Three scoping reviews have also been published but these are limited to weight interventions for children and SSB consumption or wider medical screening (i.e., diabetes, heart disease, blood pressure, and weight).[17,20,21] One of these scoping reviews reported that dentists were more willing to offer obesity screening/counseling if it was linked directly to oral disease.[17] However, all of these scoping reviews included a small number of studies, limiting their conclusions, and none assessed the views of both the public and dental teams about the integration of weight management services in dental care settings.[17,20,21] Therefore, there is a need now to systematically synthesize evidence about the views of the public and dental teams regarding the delivery and implementation of weight management interventions across dental care settings, to inform future health policy and practice.

We aimed to conduct a systematic review, meta-analysis, and qualitative synthesis to summarize the views of the public and dental teams on delivering weight management interventions in dental settings, inclusive of experiences of interventions and barriers and facilitators to implementation.

2 | METHODS

This review presents quantitative and qualitative data which are described separately here. The systematic review is registered on PROSPERO: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42022323478 and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).

2.1 | Terminology

It was likely that this review would include papers from different countries where varying terms for dentists and members of the dental team are used. For consistency, we will refer to all dental professionals as dental teams and will specify between primary (family dental practice) and secondary dental care teams (hospital/community) where required. Collectively, we will refer to primary and secondary dental care settings as dental settings.

2.2 | Selection criteria

Studies were included if they aimed to examine views and experiences about weight screening/interventions in a dental setting in children and/or adults, by the public or dental profession. Studies involving any member of the dental team including dental students were eligible. Qualitative studies, cohort studies, cross-sectional studies, and randomized and non-randomized clinical trials were eligible for inclusion. Opinion pieces, scoping reviews, systematic reviews, and literature reviews were excluded. Attempts were made to obtain full texts of any abstracts returned via the search process including by contacting authors. Studies published in languages other than English were translated. Unpublished manuscripts were included if they met the eligibility criteria. Abstracts were excluded unless data were suitable for analysis.

2.3 | Search strategy

A search of the following databases from inception to 11/02/2022 was conducted: MEDLINE (Ovid MEDLINE® Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE® Daily and Ovid MEDLINE®), ScienceDirect, Scopus, Web of Science and Cochrane Library. A grey literature search was conducted through OpenGrey. The search strategy for MEDLINE is provided in Data S1. Searches were adapted based on the search functions of each database. An updated search was undertaken through PubMed on 03/04/2023.

2.4 | Study outcomes

The outcomes of interest, regarding dental teams, were the prevalence of height, weight, and BMI screening in dental settings, the prevalence of referral to services to support patients with their weight as well as barriers to measuring and offering services. For the public, outcomes were acceptance of height, weight and BMI screening and discussion of weight in dental settings, past experiences of weight interventions in dental settings and barriers to weight screening and discussion. Communication preferences and facilitators for weight discussion and support were outcomes of interest for both dental teams and the public.

2.5 | Data extraction

Search results were uploaded to Covidence systematic review software (Veritas Health Innovation, Melbourne, Australia [available at www.covidence.org]) and duplicates were removed. Title and abstract screening were conducted by two among four independent reviewers (JL, CM, AD, and HG). Full-text screening was undertaken by two independent reviewers (JL and CM) with all decisions of inclusion or exclusion automatically recorded in Covidence. Reviewers were blinded to each other's decisions. Any disagreements were discussed between the two reviewers and resolved by consensus or by a third reviewer.

Data about study characteristics were extracted by one author (JL) and checked by a second (CM). The following data were extracted from each study: author, study aim, year of publication, country, number of participants, age, percentage female, ethnicity, study design, data collection methods, study setting, participant group, analysis, and main outcomes.

2.6 | Data synthesis and analysis of results

2.6.1 | Quantitative data

Proportional meta-analysis was conducted using 'RStudio', version 1.4.1106 (Boston, MA). Authors of eligible studies were contacted to provide further quantitative data, if required. Data were synthesized if four or more studies were measuring the same outcome. Study-specific prevalence ratios were plotted against the variance of the estimate in funnel plots to illustrate variability between studies. Combined estimates of prevalence ratios and 95% confidence intervals (CIs) were calculated. Proportional meta-analysis was undertaken for the incidence of height, weight and BMI screening by dental teams, incidence of weight discussion or counseling in dental settings, barriers to weight intervention, public support for weight screening and public support for discussion about weight. Barriers were identified during data extraction and listed as a main outcome for each study (Data S2: Table of characteristics). Barrier names (Table 1) were generated based on terminology from included studies. All individual barriers reported from each study were extracted by one author (JL) and checked by a second (CM). When four or more studies reported the same barrier, proportional meta-analysis was undertaken, with the results pooled in Table 1.

2.6.2 | Qualitative data

Thematic analysis was used to synthesize findings. Participant quotations and text, under the "results" or "findings" sections from each study were entered verbatim into NVIVO (QSR International, Release 1.3). One reviewer (JL) performed line by line coding of the primary studies and concepts of people's perspectives on weight intervention. Translation of concepts across studies was grouped into similar concepts. Two authors (JL and CM) reviewed the themes and subthemes utilizing a peer debriefing approach to create a framework of analysis.

2.7 | Quality assessment

All papers with qualitative data were rated for quality using the Critical Appraisal Skills Programme (CASP) checklist except for two papers,[22,23] which presented mixed quantitative and qualitative data that did not provide sufficient detail on qualitative findings (Data S3). Due to heterogeneity of quantitative data, it was not possible to assess risk of bias for these studies.

3 | RESULTS

There were 7851 abstracts screened with 109 full texts subsequently screened resulting in 33 eligible manuscripts (Figure 1).

Data were collected from seven countries with most studies conducted in the United States ($n = 18$) and Europe (UK: $n = 6$; Portugal: $n = 1$). Studies were published between 2005–2022. One study was unpublished.[24] Twenty-three studies involved dental teams only, six studies involved the public only and four studies a combination of both. See Data S2 for complete summary characteristics of included studies.

Twenty-eight studies [13,684 participants] were eligible for inclusion in quantitative data analysis with 22 suitable for proportional meta-analysis.[22–42] The remaining six studies are summarized and analyzed descriptively.[43–48] Most studies reported data on the views of the dental team ($n = 23$), with seven reporting views of the public about weight screening and discussion. Most studies focused on weight screening for children ($n = 15$). The most common settings were dental hospitals ($n = 10$), dental practices ($n = 4$) or a combination of dental settings ($n = 9$). Dental teams included pediatric dental teams ($n = 6$), orthodontic dental teams ($n = 1$), student groups ($n = 5$), primary care dental teams ($n = 6$), and dental schools ($n = 1$).

3.1 | Quantitative data

Data have been grouped into current practice, barriers to weight intervention reported by the dental profession and the degree of favor for weight intervention expressed by the public.

3.1.1 | Current practice

The frequency of height and weight screening in dental settings varied (4%–87%) and is low overall (29% [$p = <0.01$; 95% CI: 14%–46%]) (Figure 2). A study reporting on the practice of a group of orthodontists in the United States reported the lowest frequency of 4%,[31] whilst a UK-based study involving specialists in pediatric dentistry,

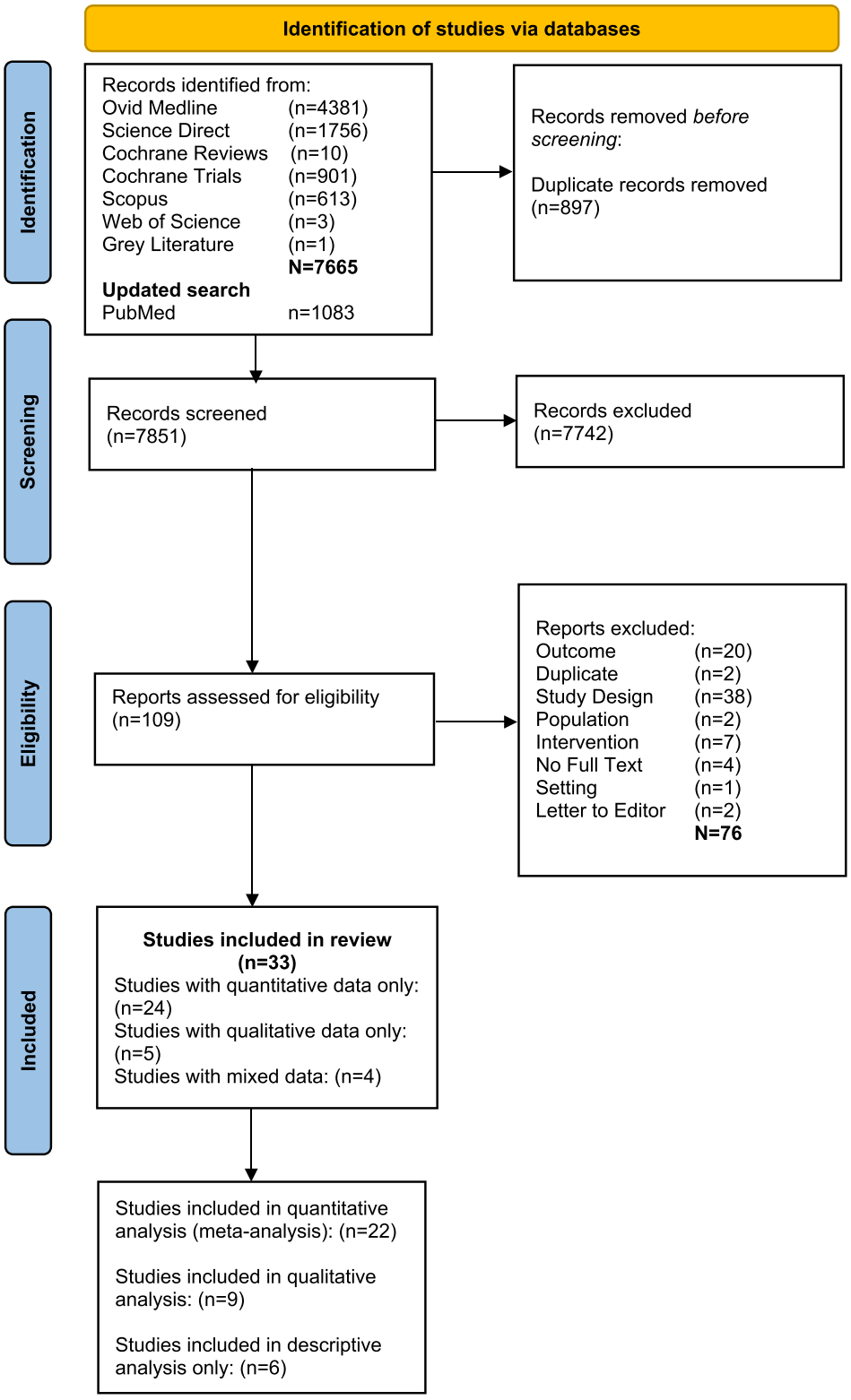

FIGURE 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram.

reported the highest individual frequency (87%).[33] One further study, not eligible for meta-analysis, reported a low frequency of height and weight screening in student clinics across 34 American dental schools ($n = 6$; 18%). Almost three quarters ($n = 25$; 74%) of dental deans/clinical directors in this study felt it important for dentists/dental students to understand the effects of obesity on dental management.[45]

Furthermore, the frequency of BMI screening was found to be low in this review. A total of 15% ($p = <0.01$; 95% CI: 3%–33%) of clinicians reported undertaking BMI screening of children and young people (range: 4%–63%). One study reported much greater BMI screening practice (63%) than other studies.[33] One further study, not eligible for meta-analysis, presented audit data on BMI screening

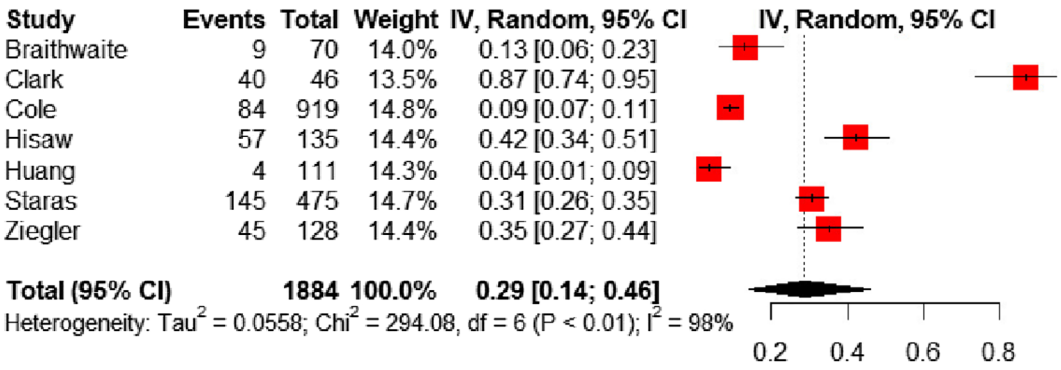

FIGURE 2 Incidence of height and weight screening by dental teams.

FIGURE 3 Incidence of weight discussion or counseling in dental settings.

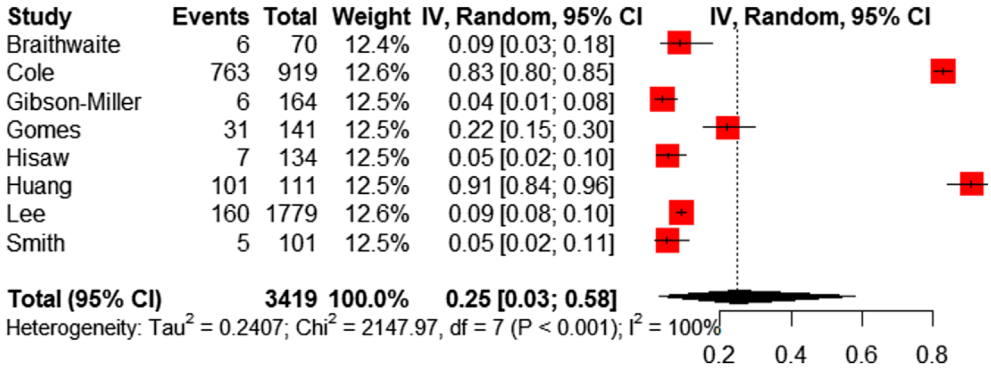

TABLE 1 Barriers reported by dental teams to weight intervention.

Barrier	Average proportion (%)[a]	Confidence interval (%)	*P* value*	Heterogeneity (%)
Weight stigma	33	19–48	<0.01	99
Lack of time	48	30–66	<0.01	98
Lack of patient acceptance	42	34–50	<0.01	92
Lack of resources/training	40	30–49	<0.01	95
Lack of remuneration	26	11–45	<0.01	97
Lack of knowledge	34	25–43	<0.01	85
Fear of offending	57	45–68	<0.01	96
Comfortable providing weight management intervention	49	28–70	<0.01	97

[a]Proportional meta-analysis.
*Level of significance $p < 0.05$.

compliance by a pediatric dentistry team in secondary care for a cohort of children awaiting management under dental general anesthetic.[48] Improved compliance with BMI screening was reported in the second audit cycle with 65% ($n = 68$) of children having their BMI calculated.[48]

The average frequency of weight discussion or counseling in dental settings was 25% ($p < 0.001$; 95% CI: 3%–58%) across eight studies with a wide range reported (4%–91%) (Figure 3). The two studies with the highest prevalence of weight discussion were based in the United States among practicing orthodontists (91%)[31] and dental hygienists working across a variety of dental settings (83%).[26] Referral to other services to support patients with weight management was low ($n = 10\%$, $p = <0.01$; 95% CI: 4%–18%) with a range from 1% to 25%.

3.1.2 | Barriers to weight intervention

All eight barriers were reported as significant challenges to delivering weight interventions by the dental profession ($p = <0.01$) (Table 1). The three most reported barriers were fear of offending, feeling uncomfortable, and lack of time. The least common reported barrier was lack of remuneration.

3.1.3 | Willingness of dental teams to deliver weight screening and interventions

Four studies reported on the willingness of dental teams to provide weight management interventions.[43,44,46,47] Over one half of dentists based in studies in the United States (57.4%) and Saudi Arabia (63.7%) were willing to undertake height and weight screening.[43,46] One further study reported over three quarters of dental students in Saudi Arabia endorsed the role of dentists in the identification and prevention of overweight and obesity for children (76%) and over two thirds of students endorsed this for adult patients (69%).[47] Wright et al., a study in the United States, reported 17% of pediatric dentists already offer childhood obesity interventions.[44] Of those not currently offering interventions, over two thirds (67%) reported an interest in commencing some form of weight intervention for children.[44]

3.1.4 | Public support for weight screening and discussion

Six studies reported on the degree of support for weight screening in dental settings[22,35,37–40] and a large proportion of the public were in support of this approach (83%; $p = <0.01$; 95% CI: 76%–88%) (Figure 4). Of the six studies, two were conducted in the UK,[37,39] two in the United States,[22,35] one in India[38] and one in Saudia Arabia.[40] Three studies were based in secondary dental care,[22,37,40] two were conducted in secondary dental care and private practice[35,38] and one was conducted in private primary dental care.[39]

Four studies reported on the level of support toward dental teams having discussions about weight[22,36,39,40] and a significant proportion were in favor of such conversations (85%; $p = <0.01$; 95% CI: 70%–96%) (Figure 5). Of the four studies, two were conducted in the United States both in secondary dental care settings,[22,36] one in the UK in private primary dental care[39] and one in Saudi Arabia in a secondary dental care setting.[40]

3.2 | Qualitative data

Nine studies (involving 3,274 participants) were eligible for qualitative analysis. Study designs included: cross sectional questionnaire with some open-ended questions (two studies; $n = 3{,}033$), semi-structured interviews (four studies; $n = 106$), focus groups (one study, $n = 40$), a combination of semi-structured interviews and focus groups (one study; $n = 28$) and a combination of cross-sectional questionnaire with some open-ended questions and focus groups (one study; $n = 67$). The focus of studies was largely children ($n = 6$) with fewer for adults ($n = 2$) or both ($n = 1$). Secondary dental care settings ($n = 6$) were more common than primary dental care ($n = 2$) with one study set across multiple dental settings. Dental teams included pediatric dental teams ($n = 2$) and primary dental care teams ($n = 4$).

Views of the public, including caregivers providing their opinions on weight screening and interventions for their children as well as adults discussing their own experiences and views, were combined with views and experiences of the dental profession and presented in a thematic map (Data S4). Three themes emerged from qualitative analysis; 1. Barriers to weight screening and discussion in a dental setting, 2. Support for weight management, and 3. Enablers to weight screening and discussion in a dental setting. Barriers to weight screening and weight discussions in dental settings were subdivided into: weight stigma, risk of inducing an eating disorder, environment, sensitive nature of weight, equipping the dental team, time, and remuneration. Enablers to weight screening and weight discussions in dental settings were subdivided into: initiating a weight conversation,

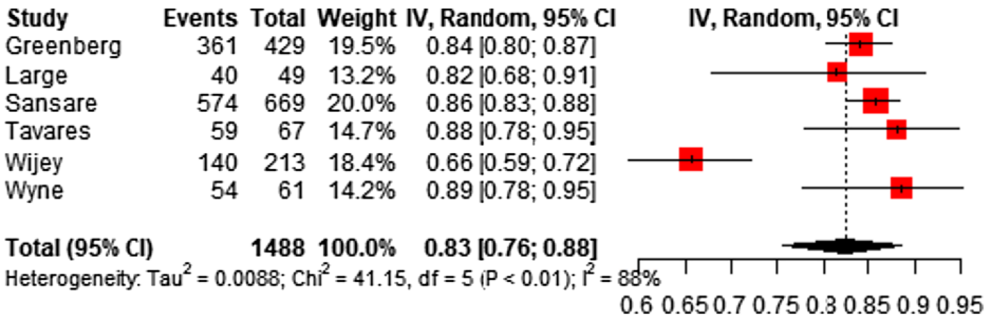

FIGURE 4 Public support for weight screening.

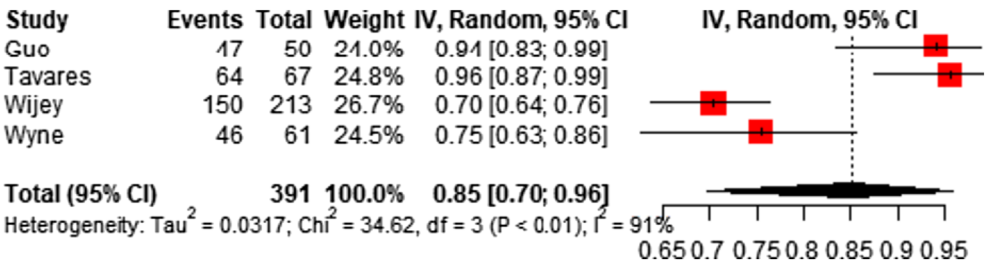

FIGURE 5 Public support for discussion about weight.

involvement of children and young people, weight conversations linked to oral health, the relevance of dental team involvement, empathetic approach, supporting discussion with visual cues (Data S5) and consistency.

3.2.1 | Descriptive Theme 1: Barriers to weight screening and discussion in a dental setting

A variety of challenges to weight screening and discussion are reported by both members of the dental team and the public.[22,23,36,37,49–53]

Weight stigma

Stigma was raised across most papers reporting qualitative data ($n = 5$). Lack of willpower and discipline, as well as laziness, were reasons given for causes of obesity by members of the dental team and caregivers. Curran et al[23] summarized that dentists in primary dental care were more likely to agree than pediatric dentists in secondary care that, "*overweight people lacked the willpower to control their diets*."

> "*It's probably the person's fault, because, even though if they aren't educated enough to know what's healthy for you, you'd notice like chocolate like would make you fat sort of thing. Like you'd kind of look in the mirror and be like, I'm getting a bit tubby now.*"
>
> *[Oral health promotion nurse[50]]*

> "*I think it's a lot down to laziness really … [pause] … but people just seem too busy and got things to do, don't they?*"
>
> *[Parent[50]]*

Mixed responses from the public were reported when asked about their experience of stigmatizing views or situations within dental settings.[51,52] Some expressed a high level of dissatisfaction at the level of stigma they felt they had experienced during dental visits whilst others alluded to a variety of experiences:

> "*I find it depends on who it is and, if they are prejudiced against overweight people, how well they hide it … You just get embarrassed … You feel the shame and - yeah, it's not pleasant*"
>
> *[Public,[51]]*

Risk of inducing an eating disorder

Concern was raised by some parents that discussing weight with their children in dental settings may unnecessarily duplicate the same messages from other sources and lead to negative outcomes on the self-esteem of their children and potentially contribute to the development of eating disorders.[50] Parents highlighted that excess weight may be a wider presentation within the family unit and children's food choices may be directly or indirectly influenced as a result (Data S4). Dentists currently engaging in routine weight screening in a pediatric dentistry department did raise the possibility that through discussion of weight, an eating disorder that a child or young person had previously kept from their family, could be exposed which could be difficult for the family to manage in a dental setting:

> "*… Could only envisage an issue with [a] patient, who had eating problems. But the patient had kept [it a] secret from their family circle. This may uncover, the problem, in the wrong environment for the family to manage.*"
>
> *[Dentist[37]]*

Environment

Contrasting views were shared by members of the public on whether the dental environment is a suitable place for weight screening and discussion.[36,50–52] Some parents felt comfortable discussing her child's weight with the dental team as "*it's a very neutral place*" and felt discussion could have an educational benefit for families (Data S4). On the other hand, other parents felt strongly that weight should not be discussed in the dental setting but instead within a less-anxiety inducing environment stating that "*dental visits are stressful enough as they are*" (*parent*,[36]). Other barriers raised by the public included access problems for people above a healthy weight, namely transport, wheelchair friendly access and size of seating. Dental teams focused on the lack of weighing scales and a lack of perceived need to invest in them as part of routine dental care as barriers.

> "*The access is paramount obviously, if I can't get in … It's the, it's doorways and things that people don't realise a disabled person's not going to get through there with a big wheelchair [yeah] and bigger chairs [yeah].*"
>
> *[Public[52]]*

Sensitive nature of weight screening and discussion

Participants reported conversations around weight can be sensitive. Dental teams were concerned with causing offense to patients, risking breakdown of clinician–patient relationships and felt uncomfortable addressing weight if their patient had not raised it as a concern.[37,50–52] Dentists undertaking routine weight screening for children in a dental hospital setting reported varying experiences with some families being open to discussion whilst others disengaged or did not wish to talk about their child's weight:

> "*It is a difficult subject to broach. As expected, some parents are very open to discussion whilst others understand but don't want to talk about it…*"
>
> *[Dentist[37]]*

Patients were more likely to report negative experiences of weight discussion when they felt there had been a lack of privacy:

> "*It happened once and I walked out. I felt disgusted … I don't like my bloody weight, to have to … discuss it in front of everyone in the waiting room.*"
>
> *[Public[51]]*

Equipping the dental team

Lack of training, lack of knowledge and "*no clear guidelines*"[23] are identified by the dental team as barriers to providing weight screening and discussion. Where training had been provided before commencement of introducing routine weight screening, some members of the dental team felt more was needed to better support them:

> "*More training at the beginning on how best to discuss a patient being overweight would have been helpful.*"
>
> *[Dental team[37]]*

> "*I would like to know more because I don't know much about BMI and obesity. All I know is that a high BMI means they could be overweight. But I don't know about the cut-off points and when it is normal. I need to know everything from scratch.*"
>
> *[Dental team[53]]*

Time pressures and remuneration

Primary care dental teams considered lack of time and remuneration as barriers to weight screening.[50] Some concern was shared among secondary care dental teams with the opinion that families may be less likely to engage in dental led weight management interventions should they have to pay for it in private settings. Regarding time pressures, some teams currently providing routine BMI screening offered a positive insight:

> "*Majority of patient's fitted within the safe, healthy weight, not impacting on additional needs of the patient. The clinic time was not severely affected.*"
>
> *[Dental team[37]]*

> "*In a private practice, where the parent had to pay out of their pocket for obesity screening and management, they're more less likely to use it. Whereas, in the public, if Medicare was to cover it for free, then it would be an easy option for them.*"
>
> *[Dental team[53]]*

3.2.2 | Descriptive Theme 2: Support for weight management

Across the studies, caregivers were supportive of BMI screening for their child(ren) and there was a general acceptance of weight management interventions from the dental teams involved:

> "*it's a positive thing that we may be able to help improve our patients health and lives in this way.*"
>
> *[Dental team[37]]*

> "*… clinicians were enthusiastic about the HWI [healthy weight intervention]; most thought that it would be possible to implement and that their offices would consider it.*"
>
> *[Author summary[22]]*

Openness to weight discussion in primary and secondary dental care settings was documented in a study based in North-East England by adults who were awaiting or had received dental care within the bariatric dental service. The author reports that patients were willing to discuss their weight and that no upset or difficulty discussing weight and its impact on dental care was experienced.[52]

> "*you've got to be open about things, you know what I mean, I'm 60 [yeah], I'm never going to have a size 12 figure.*"
>
> *[Public[52]]*

3.2.3 | Descriptive Theme 3: Enablers to weight screening and discussion in a dental setting

This theme encompassed suggestions from the public and dental teams on communication preferences to facilitate acceptable and productive weight discussions in dental settings.

Initiating a weight conversation

Prior to any weight discussion, the feeling most widely reported was the need for a good clinician–patient relationship.[36,51] Avoiding discussion at any first visit, such as with a new dentist or following referral to another dental service, was discouraged:

> "*having rapport is most important before this conversation. Should not take place at first visit.*"
>
> *[Parent/guardian[36]]*

Other enablers to initiating a conversation about weight were to start with facts such as highlighting to a parent/guardian where their child mapped on a child growth chart and where they may wish to aim for to reach a healthier outcome. Approaching the discussion conversationally was also raised as important:

> "*When the fact is there, this is where she should be and this is where she's at right now … that would be a good way to start the conversation. I want to know now what's going on.*"
>
> *[Parent/guardian[49]]*

Weight conversations linked to oral health

Caregivers and dental teams recognized a relationship between diet and oral health and that diet is often discussed during routine dental visits. Building on this expected discussion point was viewed as a way to link in weight to increase general acceptance of weight conversations as well as encourage positive lifestyle changes to address decay and excess weight:

> "tie this together with dental health, patients will probably be more likely to accept."
>
> [Dentist[36]]

> "I tell them that because of obesity, and the diet that the patient is having, it is causing a little problem with our health. If you can cut down the diet, then you have less decay, you'll be less overweight. So, there is a win-win situation, when you control this sort of thing."
>
> [Dental team[53]]

Empathetic approach to weight conversations

The public raised the importance of the dental team approaching weight discussions empathetically following consideration of individual or family circumstances before providing advice (Data S4). Recognizing patients' feelings during weight discussion and responding appropriately was also noted to be important. It was expressed that dental teams should respect individuals who do not wish to engage in certain aspects of the discussion and tailor discussion accordingly:

> "Once the topic is raised, and it's identified that I'm heavy, it should be left there. We don't need to keep discussing it. We just need a practical solution and to run with it."
>
> [Public[52]]

Consistency

Collaborative efforts within dentistry and with other healthcare professionals, such as General Medical Practitioners (GMPs), to reinforce the message of a healthy weight were recommended.[23,37,49,50,52] There was also recognition that dental teams often have more frequent exposure to the public as opposed to other healthcare professionals suggesting the importance of utilizing dental teams:

> "If it [height and weight measurements] happened at every visit, I would be totally fine with it."
>
> [Parent[49]]

> "I think it's more helpful if all of the offices [all health care providers] talk about [healthy lifestyles] because we've seen the dentist office twice a year. More than their primary care doctor."
>
> [Parent[49]]

Relevance of dental team involvement

Contrasting views were reported when considering the appropriateness and relevance of dental team involvement in weight interventions. Some caregivers regarded the dental team as part of the larger medical team and were welcoming of dental teams providing weight interventions. Some went further to suggest which member of the dental team they felt should lead the weight discussion. However, some members of the public felt that the dental team had no place in discussing weight and offering support:

> "I think it would actually be very appropriate because teeth are still a part of your body."
>
> [Parent[49]]

> "my child listens to input of others, it would be better to have the dentist- someone of authority, deliver the message."
>
> [Parent[36]]

> "I don't think I'd like to be measured, no. It's not a specialist. He's not a GP, dietitian or anything like that. He's just looking at your oral health"
>
> [Public[51]]

Involvement of children and young people

One study asked caregivers whether they would prefer their child to be present and involved in discussions regarding their weight.[36] The consensus was for the child to be present during weight conversations but the caveat being that the dental team should check with the parent/guardian first to ensure this was in accordance with the family wishes (Data S4). One study provided insight from the profession's viewpoint: "*Sometimes the child is anxious and will not leave the parents side, this makes it difficult to have this discussion*" (Dental team[37]). This may suggest a preference for weight conversations to take place in the absence of the child completely or concur with the caregiver above that any weight conversation regarding a child should first be raised with the parent(s) only.[36]

4 | DISCUSSION

4.1 | Statement of principal findings

Weight screening and discussion of results is not routine practice among dental teams. Reasons identified by the dental team for not providing weight intervention included hesitancy and reluctance to discuss a sensitive topic with patients to avoid causing offense, risk of inducing harm through triggering or focusing attention on the possibility that patients have an eating disorder, lack of resources such as training and guidelines, and a lack of time to complete screening and discuss the outcomes. Nonetheless, the consensus from dental teams already providing routine weight screening and weight management interventions was positive in terms of the receptiveness of families and acceptable integration of weight screening/interventions into routine patient assessment. Moreover, the public appeared largely in favor of weight screening and discussion by dental teams if performed sensitively and consistently for all patients regardless of their weight status. Both the public and dental teams identified ways of supporting weight discussions such as through the use of information resources and taking an empathetic approach. Regarding children specifically, it was considered that best practice would be to consult caregivers first regarding children's weight and involve the child in discussions, if the caregiver felt this was appropriate and beneficial. Of concern, studies

included in this review highlighted that dental professionals often hold stigmatized views about overweight and obesity with negative impacts reported by patients.

4.2 | Findings in relation to the existing literature

Consisent with this review, previous reviews have found that involvement of dental teams in weight screening and the delivery of interventions is low and not routine practice.[17–21] Engagement in screening and discussion within secondary care dental settings (hospitals/community services), especially among the speciality of pediatric dentistry in hospitals, is often reported to occur more frequently than in primary dental care settings.[23,31,33,54] We can offer some explanations as to why this might be the case. The greater receptiveness among secondary dental care teams, such as hospital or community pediatric dentistry and orthodontic teams, may be related to their working environment and remuneration, which may allow for greater time and resource investment for preventative health and weight management interventions than might be the case for primary care. Also, pediatric and orthodontic teams may routinely measure BMI as part of a child's pre-operative assessment for general anesthetic or sedation or to facilitate prescription of medication. The high receptiveness from pediatric dental teams in secondary care may indicate a perception that offering weight intervention to children is more acceptable than for adults, and/or that it is more accepted by the public.

Comparison between public and private dental settings and understanding difference in rates of acceptance by the public of weight intervention is further complicated by the varying nature of health services between countries. This is additionally complicated by individual studies taking place across both primary and secondary care settings making it difficult to isolate in which contexts weight management interventions in dental care settings might work best, and in which populations they might be most acceptable. That said, several studies involved a combination of settings including both primary and secondary dental care and private services and generally reported a high level of support for weight interventions but low involvement. Furthermore, only one study,[39] with adult patients, was solely based in a private dental setting and still reported a higher proportion of patients who supported screening (66%) and discussion (70%) than did not, but support was lower when compared with other studies with a child or adult patient cohort set in public or mixed public and private dental settings.[35–40,55]

Fear of offending patients was the highest reported barrier in our quantitative analysis. Likewise, in reviews by Greenberg et al.[17] and Arora et al.,[19] risk of patient rejection of weight support and fear of offending were also recognized as key barriers by dental teams. This concern is not specific to dentistry. A recent systematic review by Warr et al explored General Medical Practitioners' and practice nurses' perspectives on delivering weight intervention to patients[56] and reported sensitivity around weight discussion. Risk of offending was raised alongside lack of confidence, weight not taking priority during consultations and clinicians avoiding weight discussion with patients due to concerns patients may feel stigmatized. Some clinicians also had stigmatizing views toward patients living with obesity.[56] Similarly, Henderson and Arora et al. reported concerns by dental teams' about the lack of time to provide weight management interventions and that discussing weight could lead to deprioritisation of oral health advice which is suggested should remain the primary focus of preventative health advice by dental teams.[50,53]

Our review identified lack of training, scarce evidence of inclusion of obesity and its impacts on management within dental school curricula and only occasional references within dental standards, as likely barriers to implementation, as reported by other studies.[18,47,54] Consequently, dental teams may question if delivering weight interventions is within their scope of practice. In order for dental teams to feel supported in engaging in this holistic approach to dental care, clear guidance and advocacy is needed from stakeholders, including professional regulatory bodies, as well as clarity on indemnity requirements.[57]

In our quantitative analysis, lack of training, resources and lack of knowledge were reported as significant barriers to delivering weight interventions. These barriers may contribute to weight stigma which is also reported to be a significant barrier in both the quantitative and qualitative findings, with some patients reporting previous stigmatizing experiences.

Enablers to weight screening and weight discussion reported by Warr et al support our findings. Further training and consistency across services to deliver routine BMI screening, alongside guidelines or a framework to support interventions, would facilitate weight discussion with patients. An interprofessional training scheme to support healthcare professionals to deliver weight intervention has been piloted involving dietetic and pediatric dentistry teams.[18] The pilot was favored by the dental and dietetic teams and demonstrated an interdisciplinary approach across healthcare to better support patients.[9,18] Despite the concerns of dental teams consistent with previous reviews, we found a high level of patient acceptance for weight screening and intervention.[17,18,20,21]

4.3 | Strengths and limitations

To our knowledge, this is the first systematic review and meta-analysis presenting the views of dental teams and the public on inclusion of weight management interventions in dental settings. Our review goes further than previous scoping and systematic reviews to present both quantitative and qualitative data. The search criteria were inclusive of studies set in both primary and secondary dental care settings involving a variety of dental team members to ensure comprehensive and representative viewpoints were reported. Our findings highlight not only barriers (perceived or actual) reported by dental teams and the public to weight management interventions, but enablers were also identified, which included associating weight to oral health, empathetic approach to discussion and inclusion of children in discussions as directed by their caregivers. The least frequent reported barrier in our review was lack of remuneration although this

may not reflect wider opinion, especially among non-salaried dental services. Also, these results may be subject to social desirability bias given financial matter can be a sensitive topic and responders may have been reluctant to reveal their true beliefs on this matter. Financial incentives may be an important enabler in dental led weight management interventions and awareness of such enablers are instrumental for policy makers and services aiming to establish or improve weight initiatives for dental patients.

This study has some limitations. Data are limited by heterogeneity given the variation across studies in terms of dental settings, dental teams, patient sample receiving the weight intervention, country and healthcare system, sample size, and study design. In addition, because of the variations, there was no method for measuring risk of bias for studies when using proportional data. Due to differences in questionnaire design and phrasing of questions, the highest reported prevalence for weight screening and intervention was taken from each study. With overall low involvement in weight management interventions reported by dental teams, it is possible that engagement is over-reported as more dental teams may undertake screening or interventions sporadically and not routinely.

Studies were published between 2005 and 2022 and some barriers reported in earlier studies may now be considered differently in light of recent evidence of the relationship between weight and dental decay.[3] A lack of correlation between dental decay and obesity was reported as a barrier in raising the issue of weight with patients in our review.[23] However, in 2019, Public Health England disseminated evidence that children were significantly more likely to experience dental decay if they were overweight or very overweight when controlling for deprivation, ethnicity and water fluoridation.[3]

Most of the included studies were conducted in high-income countries (i.e., United States and UK), with relatively few studies from low- and middle-income countries, although there is representation from the global south (i.e., Saudia Arabia, India, and Pakistan). When interpreting the review findings consideration should be given to the possibility that perspectives on oral health and weight management may differ across varying cultures and countries. One implication of such variability is that different models of incorporating weight screening and management, as part of a wider health assessment by dental teams, will likely be needed to meet service requirements across different dental settings including private versus state healthcare.

5 | CONCLUSION

The provision of weight management interventions in dental settings is low. A variety of barriers were proposed by dental teams about raising the topic of weight and offering interventions, yet there is a high degree of acceptance of weight screening and intervention among the public. This should offer reassurance to dental teams that weight management interventions can be well received by patients. Further research to explore and pilot the most accepted and feasible weight intervention approaches within dental settings is recommended. Meanwhile, raising awareness of weight stigma and approaching conversations about health in a supportive manner, achievable through training, is recommended for all dental teams.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

ORCID

Jessica F. Large https://orcid.org/0000-0002-5092-7088
Claire Madigan https://orcid.org/0000-0002-6782-0017
Henrietta Graham https://orcid.org/0000-0002-0759-7992
Amanda J. Daley https://orcid.org/0000-0002-4866-8726

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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